Attention-Deficit/Hyperactivity Disorder and Criminal Behavior

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Abstract

There is a strong consensus among criminologists that impaired self-control plays a central role in the developmental origins of crime. It therefore follows that interventions to enhance self-control should be an essential component of an overall approach to the prevention of criminal offending. Unfortunately, these approaches have typically failed to appreciate the relevance of Attention Deficit/Hyperactivity Disorder (ADHD), which is essentially a disorder of self-control, to criminal offending. This article addressed this neglect by reviewing the literature that establishes ADHD as a major risk factor in the development of criminal offending in males which results in a disproportionate concentration of males with ADHD in the juvenile and adult criminal justice systems. The implications for prevenction based upon this conclusion were discussed.

Keywords

Attention-Deficit Hyperactivity Disorder; Criminal Behavior; Self-control

Introduction

There is a strong consensus among criminologists that impaired self-control plays a central role in the developmental origins of crime (Moffitt, 2012). Self-control is an umbrella construct that bridges concepts and measurements from different disciplines (e.g., impulsivity, self-regulation, inattention-hyperactivity, executive function) (Moffitt, 2012). It therefore follows that early interventions to enhance self-control should be an essential component of an overall approach to the prevention of criminal offending (Moffitt, 2012). Unfortunately, these approaches have typically failed to appreciate the relevance of the most common neurodevelopmental disorder of impaired self-control in juveniles, Attention Deficit/Hyperactivity Disorder (ADHD) (American Academy of Pediatrics, 2011), (Barkley, 1997, 2006, 2010) to criminal offending and its prevention. For example, in a recent meta-analysis of the effectiveness of programs to enhance self-control in delinquency reduction (Piquero, Jennings, & Farrington, 2010), not a single study involved ADHD. Similarly, in a recent volume on the future of criminology with contributions from leading criminologists (Loeber & Welsh, 2012), ADHD received so little attention that it did not merit a listing in the index.

This article will address this neglect by reviewing the literature that establishes that ADHD is a major risk factor in the development of criminal offending in males which results in their disproportionate concentration in the juvenile and adult criminal justic systems. The focus will be on males since the literature on females is relatively rare compared to that of males (Molina, 2011), as well as the major developmental antecedent of criminal offending, early onset conduct disorder (CD) which tends to be life course persistent, is overwhelmingly male (Eme, 2010; Lahey & Waldham, 2012; Moffitt, 2006), and a related construct, career criminality (DeLisi & Piquero, 2011).

ADHD Increases Risk for Criminal Offending

ADHD involves more than just the obvious core symptom dimensions of inattention/distractibility and impulsivity/hyperactivity (Willcutt et al., 2012). There is a consensus that deficits in what is variously termed self-control, self-regulation, or executive functioning undergird these symptoms (Barkley, 1997, 2006, 2010; Nigg, 2006). Hence ADHD, properly conceptualized, is essentially a disorder of self-control. Many different biologically based etiologies may cause ADHD, with neurological (e.g., low birth weight) and genetic factors as the most common causes (Nigg, 2006; Tharpar et al., 2013). However, it is clear that numerous psychosocial variables can influence symptom severity, impairments and outcomes (Barkley, 2006; Tharpar et al., 2013). Severe ADHD symptoms can emerge in preschool (Dupaul, & Kern, 2011) and markedly increase risk for the development of impairments in multiple domains (Barkley, Murphy, & Fischer, 2008; Nigg, 2013). One of those domains is criminal offending.

Studies on children diagnosed with ADHD that predominantly presents with symptoms of hyperactivity/impulsivity (Willcutt et al., 2012) and

followed-up into adolescence and early adulthood have consistently found higher rates of criminal offending. Mannuzza and colleagues (1989) compared arrest rates in 103 adolescent ADHD subjects and 100 normal controls (mean age of 18 years for both groups). Significantly more hyperactive than control subjects had been arrested for any offense (39% versus 20%), convicted for any offense (28% versus 11%), arrested for a felony offense (25% versus 7%), and incarcerated (9% versus 1%). Barkley, Murphy and Fischer (2008) compared the arrest rates of 147 ADHD and 73 control children (mean age 20-21). Those with ADHD had a greater rate of official arrests for misdemeanor (24% versus 11%) and for felony (27% versus 11%) offenses. Satterfield and colleagues (2007) reported a 30-year follow-up of 179 hyperactive boys (ages 6 t 12) with conduct problems The official arrest history from 18 to 38 years of age revealed that the hyperactive boys had a higher rate of adult felony arrests (37%), convictions (28%), and incarcerations (25%) than a comparison group whose rates were 9% (felony arrests), 6% (convictions), and 6% (incarcerations). Molina and colleagues (2009) with the largest clinical sample to date of children with ADHD (n=436) who had been followed-up 8 years after their diagnosis in childhood, reported that at ages 13-18 approximately 25% to 30% of the youths were in the spectrum of clinically serious antisocial behavior, 27% were arrested at least once during the 8 follow-up interval, and 36% had engaged in moderately serious to serious delinquent behavior according to youth or parent report. All these outcomes were significantly higher than a local comparison group whose rates were: 5% for antisocial behavior, 14% for arrest, and 22% for delinquent behavior. Moreover, these findings most probably underestimated the magnitude of the risk of the development of serious antisocial behavior associated with ADHD for two reasons. Firstly, the children who were lost to follow-up tended to come from demographically disadvantaged families and thus being at greater risk for antisocial behavior than those who remained in the study (Molina et al., 2009). Secondly, because at the time of the follow up most children had not entered into late adolescence, the peak period for antisocial behavior (Tremblay, 2010), the difference in risk between the two groups again is most probably an underestimate. Bussing and . (2010) in a large epidemiological study, screened a school district sample of 1,625 students aged 5 to 11 years for ADHD. The 94 youth diagnosed with ADHD were followed up 8 years later and compared to matched case controls. Children with ADHD were three times more likely to be involved with the juvenile justice system based upon parental report compared to case controls (19% vs. 6%). Furthermore, because as with the Molina and colleagues study (2009), most children had not entered the peak period for antisocial behavior at the 8 year follow-up, the difference in risk for involvement in the juvenile justice system between the two groups is most probably an underestimate. Klein and colleagues (2012) conducted a 33 year follow-up of 135 white males who were diagnosed with ADHD without CD at a mean age of 8 years and compared their outcomes with that obtained from a control group of 136 white males who were judged to be free of ADHD in childhood. At a mean age of 41, 36.3% of the ADHD group had been incarcerated compared to 11.8% of the control group. Finally, perhaps the most persuasive evidence that ADHD increases the risk for criminal offending comes from the most recent findings of the Dunedin Multidisciplinary Health and Development study (Moffitt, et al., 2011; Moffitt, 2012). This longitudinal study followed a complete birth cohort of 1,037 children from birth to age 32. Children's self-control during their first decade of life was assessed by reports of parents, teachers, researcher-observers, and the children themselves. This data, which was gathered across ages 3, 5, 7, 9 and 11 years, was then combined into a single composite measure of self control and tested whether this measure predicted crime (as well as other outcomes) after controlling for social class origins and IQ. When the sample was segmented into the highest and the lowest fifths on self control, the lowest fifth had much higher crime conviction rates as adults than the highest fifth: 43% vs. 13%. Moreover, the study also controlled for the possibility that unmeasured aspects of the family environment accounted for the correlations between self-control and crime conviction rates by comparing a separate sample of self-controlled children with their less self-controlled siblings. Consistent with their main findings, childhood self-control continued to predict crime conviction rates, even after controlling for unmeasured family effects. Lastly, it is also important to note that a measure of preschoolers (ages 3-5) self-control significantly predicted criminal convictions at age 32, albeit with a more modest effect size (Moffitt et al., 2011). Since the measures used to assess self-control were essentially measures of the core features of hyperactive/impulsive dimension of ADHD (Willcutt et al., 2012) (i.e., hyperactivity, impulsivity, inattention, lack of persistence, impulsive aggression, low frustration tolerance), what the study found was that children with many symptoms of ADHD were at high risk for criminality compared to those without such symptoms.

In conclusion, it is clear that ADHD, a disorder of self-control, is an important risk factor for the

development of criminal offending. Consequently, and not surprisingly, this results in a disproportionate concentration of males in the correctional justice system with ADHD.

Prevalence of ADHD among Males in the Juvenile Justice System

Community prevalence estimates of ADHD among juveniles in Western world vary widely across studies. This variability is unlikely to reflect true differences in the numbers of individuals with ADHD, but rather is primarily due to methodological differences such as the way symptoms were measured or the exact definitions used. Polanczyk and colleagues (2007) made a systematic review of these studies, and, after accounting for method variability, concluded that there were relatively insignificant differences in different parts of the world with the average rate being around 10% for males. However its prevalence in the juvenile criminal justice system is much higher.

In the USA, two studies provide the most reliable estimates for this country. The Northwestern Juvenile Project (Teplin, Abram, McClelland, Dulcan, & Mericle, 2002), the largest study to date of juveniles in detention facilities, randomly sampled 1,172 male juveniles (aged 10-18) who were detainees in the Cook County temporary juvenile detention center in Chicago, IL. from November 1995 through June 1998. They were interviewed within two days of intake by trained interviewers using the widely accepted the Diagnostic Interview Schedule for Children. This is the most representative sample of detainees in the United States for the following reasons: a) most juvenile detainees nationwide live in or are detained in urban areas, b) Cook County is diverse both racially and ethnically diverse c) the juvenile system in Cook County is typical of most other states, and d) the gender, age, and offense distributions in the detention center are similar to those detained nationwide (Washburn et al., 2007). The study found a prevalence of 16.6 % for males (13.3-20.5). It also cautioned that it may have underestimated the true prevalence for several reasons such as excluding youth who were referred directly into the mental health system. Of far more importance however, (as the study noted and as will subsequently be discussed), was that exclusive reliance of youth self report (especially self report of youth who are delinquent) to assess symptoms and impairments of ADHD likely resulted in underreporting of such.

The Texas Juvenile Correctional System Study (Harzke et al., 2012) which represents the largest sample of committed youth studied to date and the only statewide census sample of such youth, is a cross-sectional analysis of electronic data routinely collected by the Texas juvenile correctional system and its contracted medical provider organization. The study estimated the prevalence of ADHD among 10,469 males aged 10-21 who were committed to Texas juvenile correctional facilities between January 1, 2004 and December 31, 2008. Within 30 days of admission, all juveniles underwent a comprehensive mental health appraisal made by a qualified mental health professional using a guided structured interview based on the Diagnostic and Statistical Manual of Mental Disorders Fourth Edition. From this evaluation or subsequent assessments during confinement, most psychiatric diagnoses were made by psychiatrists or clinical psychologists. The prevalence rate for ADHD for males was found to be 18.6%.

Similar findings have been reported in studies from Canada, Sweden, Germany, Finland, and Norway in which up to two-thirds of young offenders screen positively for childhood ADHD, with about 45% continuing to meet criteria for a current diagnosis ADHD (Young et al., 2011). Once again, as with the community estimates of prevalence, the rates vary widely as a result of numerous methodological variations and limitations (Harzke et al., 2012). In addition, differences in national criminal justice systems such as the type of offenses that lead to imprisonment is another possible explanation for the different estimates (Konstenius et al., 2012). Regardless of the reasons, however, there is no doubt that there is a markedly disproportionate concentration of males with ADHD in the juvenile correctional justice system.

Prevalence of ADHD among Males in the Adult Criminal Justice System

The community prevalence estimate for male adult ADHD using a nationally representative sample in the USA is approximately 5% (Kessler et al., 2006). In the USA the author is aware of only two published studies that have employed a random sample of prison inmates. The first study randomly sampled 102 inmates in the Utah State Prison (Eyestone & Howell, 1994). Results indicated that 26% were diagnosed with ADHD based upon self-reported symptoms that met DSM-III criteria for ADHD. The second study randomly sampled 264 males in the general population of the Iowa state prison system (Gunter et al., 2008). Results indicated that 23% were diagnosed with ADHD based upon self-reported symptoms that met DSM-IV criteria for ADHD.

Community prevalence estimates for male adult ADHD in the international scientific literature (based upon studies published in English and samples of convenience) range from 1% to 7.3% with a pooled

estimate of 2.5% (Simon et al., 2009). Prison prevalence estimates for males having screened positively for childhood ADHD are approximately 50% for prison populations in Canada, Finland, Germany, Norway, Sweden, and the USA, (Young et al., 2011). Prevalence estimates for a current diagnosis of ADHD based upon random samples deemed to be representative of the entire prison population in the country are as follows: 45% in Germany (Rosler et al., 2004), 57% in Israel (Einat & Einat, 2008), 30% in Norway (Rasmussen et al., 2001), 40% in Sweden (Ginsberg, Hirvkoski, & Lindefors, 2010); 14% in the United Kingdom (Young et al., 2011).

In conclusion, despite varying prevalence estimates, there is no doubt that there is a markedly disproportionate percentage of males with ADHD in the adult correctional justice system. Furthermore, these prevalence estimates for both juveniles and adults are likely to be too low because diagnosis is based solely upon self-report.

ADHD Diagnosed Solely by Self-Report

All studies of the prevalence of ADHD in the juvenile and adult criminal justice systems suffer from the limitation of relying exclusively on self-report to diagnose childhood and current ADHD. This most probably results in an underestimate of the true prevalence of ADHD. For example, in the Northwestern Juvenile Project study, Templin et al. (2002, p. 1135) remarked that "Attention-deficit hyperactivity disorder is difficult to assess via self-report and is even more challenging to diagnose among delinquents." Thus, Schwaab-Stone et al. (1996) in examining the criterion validity of the Diagnostic Interview Schedule for Children Version 2.3 found little more than chance agreement between youth (aged 9-18) report of ADHD symptoms and clinical assessment. Similarly, Young et al. (2010) conducted a study to determine the most reliable source of information of ADHD symptoms by comparing rating scales scored by 54 male delinquents who were detained in a high risk care home and their teachers with psychiatric diagnosis of ADHD made by a professional clinical assessment. Sensitivity rates were 33% for delinquent self report compared to 67% for teacher report. Because of this limitation, the most recent authoritative clinical practice guidelines for the diagnosis of ADHD for juveniles (4-18) specifies that information should be obtained primarily from reports from "parents or guardians, teachers, and other school and mental health clinicians involved in the child's care" (American Academy of Pediatrics, 2011, p.1). Similarly. with regard to adults, Barkley, Murphy, and Fischer (2008) conducted a follow-up study into young adulthood (age 21) of 147 males who had previously been diagnosed with ADHD in childhood. Using a developmentally referenced criteria to diagnose ADHD in adults resulted in a huge discrepancy when the criteria were assessed by self-report (12%) vs. parental report (66%). The correlation between self- and parent-reported levels of ADHD symptoms was just .21. Because parent-reported symptoms were found to have a far greater association with various measure of impairment at age 21 than self-reported symptoms, the study concluded that parent reports provided a more accurate description of current ADHD symptoms and impairments than self-report.

In conclusion, there is a consensus that failure to obtain information from parents, teachers, or in the case of adults, a significant other, can be expected to result in significant under diagnosis of current ADHD in juveniles and adults (Barkley, Murphy, & Fischer, 2008; Kessler et. al., 2006; Simon et al., 2009). Thus, having established that the markedly disproportionate representation of ADHD among those in criminal justice system supports the findings from the previously discussed longitudinal studies that ADHD is a significant risk factor for the development of criminal offending, what needs to be addressed next is "what mechanisms link hyperactivity/impulsiveness/attention deficit/low self-control/… etc. to offending" (Farrington, 2012, p. xx).

Developmental Pathway to Criminal Offending

A developmental pathway is the "orderly behavioral development between more than two problem behaviors with individuals differing in their propensity to progress along the successive problem behavior represented by the pathway during development" (Loeber & Burke, 2011, p. 34). Note that the conceptualization of a developmental pathway is not deterministic, but refers to a propensity, a probability that serious antisocial behavior will develop (Loeber & Burke, 2011). Also, note, that since, in general, all types of antisocial behavior are correlated and thus risk factors and interventions that apply to one type of antisocial behavior are also likely to apply to the others (Farrington, 2009), the developmental pathway that will be discussed that focuses on CD can be generalized to other types of antisocial behavior. One developmental pathway that leads to CD begins with high levels of emotional and behavioral dysregulation resulting in problems in the executive control of behavior (Frick, 2012), which is essentially a description of ADHD (Barkley, 1997, 2006, 2010; Nigg, 2006). In this model, ADHD behaviors emerge first, followed by Oppositional Defiant Disorder (ODD) behaviors reflecting a pattern of

negativistic, defiant, disobedient, and hostile behavior towards authority figures. These behaviors are followed by more severe conduct behaviors which substantially increase risk for criminal offending such that up to 70% of children diagnosed with CD will have a criminal conviction in adulthood (Burke, Loeber, Lahey, & Rathouz, 2005; Lahey & Waldham; 2012; Loeber, Burke, & Pardini, 2009; Rocque, Welsh, & Raine, 2011).

ADHD Increases Risk for ODD

ODD, with a comorbidity rate of 52% with ADHD, is the most common comorbid condition of ADHD in juveniles (Willcutt et al., 2012). This comorbidity is best explained by the core impairments of behavioral and emotional impulsivity in ADHD (Barkley, 2006, 2010; Willcutt et al., 2012). These twin impairments commonly result in symptoms such as irritability, impatience, anger, low frustration threshold, and reactive aggression (Barkley, 2010; Frick & Viding, 2009), which greatly increases the risk for coercive, oppositional interchanges (Barkley, 2006; Burns & Walsh, 2002; Lahey & Waldham, 2008). Indeed, it is estimated that a typical child with ADHD has an astonishing half a million of these negative interchanges each year (Pelham & Fabiano, 2008), thereby adding support to Barkley's (2010) assertion that having ADHD virtually creates a borderline case of ODD in children.

In conclusion, Sibley and colleagues (2011), in their discussion of the developmental progression that leads to serious delinquency, articulated the consensus that "Most agree with the hypothesis that this troubling path begins with impulsivity, ADHD, undercontrolled temperament, or some variant thereof (p.22)."

ODD Increases Risk for CD

Although highly correlated, ODD and CD are different enough to warrant consideration as different dimensions of antisocial pathology (Lahey & Waldham, 2012). For example, CD is more related to parental antisocial behavior, psychopathology, and atypical maternal parenting and is also more strongly predictive of adult antisocial outcomes than ODD (Lahey & Waldham, 2012). In the pathway model, ODD's role as a developmental precursor to CD has been well documented (Frick & Marsee, 2006; Lahey, Loeber, Burke, & Applegate, 2005; Moffitt et al., 2008) as it is now understood that far from being simply a benign, milder form of CD, ODD plays a key role in the development of CD and is one of the strongest predictors of the onset of CD and of the course of CD symptoms over time (Loeber, Burke, & Pardini, 2009). In addition, although the majority of children with ODD do not go on to develop CD (Loeber, Burke, & Pardini, 2009), if childhood onset CD develops, it is almost always preceded developmentally by ODD (Burke, Waldman, & Lahey, 2010). This development is likely to occur when social contexts (e.g., family and peer environment) increase rather than decrease the antisocial propensity of ADHD/ODD (Dick, 2011; Lahey & Waldman, 2008; Meier et al., 2008; Murray & Farrington, 2010).

Conclusion and Clinical Implications

ADHD is a major risk factor in the development of criminal offending in males, which results in a disproportionate concentration of males with ADHD in the juvenile and adult criminal justice systems. The clinical and treatment implications of this finding are identical with those detailed by Nigg (2013) in his recent review of adverse physical health outcomes of ADHD who concluded that " by virtue of its early onset prior to many of the complicating conditions that ultimately 'carry' the individual all the way into disease, ADHD may be one of the earliest reliable predictors of long term poor health outcomes, making it a powerful potential target for secondary prevention early in life before other risk conditions emerge (p.234)." As applied to criminal behavior, ADHD markedly increases the liklihood of the development of the complicating conditions of ODD and CD which 'carry' the individual into criminality. If preventive efforts prove to be successful in significantly reducing the long term negative developmental trajectories of children with ADHD/ODD/CD who are at high risk for criminal offending, they would pay huge dividends by reducing a panoply of societal costs, saving taxpayers money, and promoting prosperity (Moffitt, et al., 2011).

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